CLAIMS OF THE INVENTION

WE CLAIM:

1.   A method for packet queueing in a packet processing device comprising:

receiving a packet;

analyzing the packet to determine a designated queue for the packet;

generating a packet identifier based on the analyzing;

associating an address to a shared memory with the packet identifier;

storing the packet identifier in the shared memory at the associated address; and

storing the associated address in the designated queue.

2.   The method of Claim 1, wherein storing the associated address in the designated queue comprises loading the associated address in a first-in, first-out device.

3.   The method of Claim 1, wherein analyzing the packet comprises analyzing type of service information.

4.   The method of Claim 1, wherein a queue comprise a controller and a first-in, first-out device.

5.   The method of Claim 1, further including evaluating if an address is available.

6.   The method of Claim 1, wherein the packet identifier stored in the designated queue comprises the associated address and information regarding the packet length.

7.   A method for tracking data items:

assigning data items one or more designations of a plurality of designations;

for each designation, obtaining and assigning a memory address, the address corresponding to a location in a shared memory;

tracking each assignment of designation of data items;

storing a record of each designation and assigned memory address in the shared memory at the obtained memory address, wherein the shared memory stores a plurality of assignments of designations.

8.   The method of Claim 7, wherein assigning data items one or more designations comprises assigning the data items to one or more queues of a plurality of queues.

9.   The method of Claim 7, wherein tracking comprises tracking order of receipt of at least one data item.

10.   The method of Claim 7, wherein the memory is divided into a plurality of locations.

11.   The method of Claim 7, further including deleting one or more records from the shared memory if the shared memory is full.

12.   The method of Claim 7, further including manipulating data items based on the designation and the tracking.

13.   The method of Claim 12 wherein the manipulating data items comprises actions selected from the group consisting of deleting, transmitting and performing processing on.

14.   A shared memory and plurality of queues configured for use in a data item processing device comprising:

        a shared memory configured to store at least one data item identifier, the memory having memory locations defined by memory addresses;

        a plurality of queues, at least one queue configured to track the order of receipt of at least one data item identifier assigned thereto by storing memory addresses; and

        control logic configured to initiate storage of at least one data item identifier in shared memory based on an evaluation of the data item identifier or the data item identified by the data item identifier and assign memory address at which data items are stored to one or more queues.

15.   The shared memory of Claim 14, wherein the shared memory stores a plurality of data item identifiers that identify data items that are assigned to various of the plurality of queues.

16.   The shared memory of Claim 14, each queue comprises a first-in, first-out memory structure.

17.   The shared memory of Claim 14, further including a memory address allocation unit in communication with the control logic and the plurality of queues, the memory address allocation unit configured to provide a memory address to at least one queue or the control logic.

18.   The shared memory of Claim 17, wherein the memory address allocation unit comprises a first-in, first-out memory structure.

19.   The shared memory of Claim 14, further including transmit logic configured to obtain a memory address from a queue and initiate retrieval of a data item identifier from shared memory.

20.   A queue system configured to utilize a shared memory comprising:

a shared memory, wherein items stored in shared memory are identified by a memory address;

two or more first-in, first-out queues;

an address allocation unit configured to allocate memory addresses;

a controller configured to:

receive and analyze packet data corresponding to a packet;

request an address from the allocation unit;

associate the address with a packet identifier;

assign the address to one or more of the queues based on the analysis of packet data; and

initiate storage of the packet identifier in shared memory at the address associated with the packet identifier.

21.   The system of Claim 20, wherein the system is configured to track the order of receipt of packets in a computer network router.

22.   The system of Claim 20, wherein the shared memory is configured to store 64,000 packet identifiers.

23.   The system of Claim 20, wherein the address allocation unit comprises a first-in, first-out device loaded with at least one memory addresses.

24.   The controller of Claim 20, wherein each memory address identifies an identical size memory location.

25.   A first-in, first-out queue system having a shared memory comprising:

a controller configured to receive a packet, assigned the packet to a transmit priority queue, and store the packet in a first memory at a packet address;

at least one transmit priority queue having order tracking system and an allocation unit interface, wherein the at least one transmit priority queue is configured to store the packet address in a shared memory;

a shared memory configured to store received packet addresses at memory locations in the shared memory; and

an allocation unit configured to interface with the at least one transmit priority queue to allocate memory addresses for the shared memory to the at least one transmit priority queue.

26.   The system of Claim 25, wherein the allocation unit comprises a first-in, first-out memory structure containing memory addresses to the shared memory.

27.   The system of Claim 25, wherein the shared memory comprises RAM.

28.   The system of Claim 25, wherein the transmit priority queues comprise first-in, first-out devices.

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29.   The system of Claim 25, further including a transmit module configured to select one of at least one transmit priority queue from which to transmit, the transmit module obtaining a memory address from the selected queue to obtain information regarding the location of a packet to be transmitted.

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30.   A method of transmitting information identified by a next-out item from a queue, the queue utilizing a shared memory comprising:

        designating a queue with transmit priority;

        requesting a next-out item from the designated queue, the next-out item identifying a memory address to a shared memory;

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        retrieving the data item stored in the shared memory at the memory address identified by the next-out item from the queue; and

        transmitting information stored at a location identified by the data item.

20   31.   The method of Claim 30, wherein the next-out item comprises an address to shared memory.

32.   The method of Claim 30, wherein the next-out item comprises at least a memory address and the information comprises a packet.

33.   The method of Claim 30, wherein the queue stores queue items that identify information that shares a similar attribute.

34.   The method of Claim 30, wherein next-out items comprise an address to shared memory, data items comprise addresses to where information is stored in a second memory, and the shared memory stores data items.

35.   The method of Claim 30, wherein the method designates from a plurality of queues, the plurality of queues sharing the shared memory to store data items to thereby reduce the total amount of memory required.